Santa Clara Valley
Urban Runoff
Pollution Prevention Program

APPENDIX C

Summary of SCVURPPP / LUS Fall 2003 Site Design Dialogues

Summary of Fall 2003 SCVURPPP/SCBWMI LUS Site Design Dialogue Results				
Site Design Goal	**Potential Conflict**	**Underlying Issues**	**Brainstormed Potential Solutions**	**Notes/ Comments**
STREETS				
Narrow Residential Streets				
Reduce Impervious Surface Area Promote Alternative Transportation— 24-foot wide streets safest for pedestrians Decreased width results in lower automobile speeds Safer and more pleasant routes for bicyclists	Access Concerns •Fire Departments •Garbage/ Recycling Trucks •Potentially Buses (although they usually stay on larger streets) Response times are extremely important for fire, medical, and other emergencies	Present day engines are nearly twice as wide and longer than pre-WWII models to handle more situations. Fire Department requires 20-foot wide travel lane (national standard) for today's trucks and risers. Standards are set to accommodate all fire rigs to allow for mutual aid (across municipal boundaries) Must have enough access for Fire Dept. to arrive and for citizens to evacuate. Fire Departments are hesitant to compromise on public safety access issues because any problems arising from compromise cannot be easily undone.	Separate alley ways to provide parking and backyard/garage access (not for emergency access) Locate hydrants strategically to reach buildings within the typical 150 feet of hose length. Grid streets (rather than cul-de-sacs)-- provide multiple alternate emergency access routes (though with increase in response times) Examine entire street ROW for possibilities to treat street edges differently, allowing for reduced impervious surfaces and enough access. Turf block and bike lanes for streetside or fire lane landscaping and additional	Stakeholders: garbage companies, fire departments, utility companies (since rights-of-way can influence stormwater runoff options) Fire Departments have more flexibility with respect to time to leave a site (egress) rather than to reach a site. Would need to consider private property issues, sanitary, stormwater, water, utility, other special easements Design turf block to have 70,000 pound capacity for fire truck loads

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			emergency access width. Install sprinklers in residences, especially those located at far end of narrow streets Tualatin Valley Fire Dept (Oregon) has implemented following idea: Equip police cars or other smaller emergency vehicles with defibrillators. Fire Department concerns with above idea: Not enough funding to staff separate smaller vehicles; not enough time to return to fire station to get smaller vehicle, especially in cases of multiple emergencies. Defibrillators take more than one person to handle effectively.	Sprinklers ($1.70 to $2.10 per square foot; $6,000 to $12,000 per unit), often offered as add-on, but better homeowner education needed. Developers may be willing to pay in exchange for density bonuses.
	Parking	Residents want to park in front of their residence. Residents may ignore restricted parking signs.	Parking “cut-outs” or “turn-outs” Permeable paving for parking areas.	

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		Oversized vehicles (moving vans, delivery vehicles, etc. can block street.)	Use alleys for parking	
		If automobile owners park on sidewalks to protect cars from collisions, pedestrians are forced into travelway.	Educate automobile owners to properly park near curb to maximize access on roadway and sidewalk.	
		Developers want to ensure plenty of parking for marketability	Lenders may be more willing to take risks with well known, larger developers.	
		Financial lenders may not grant loan if parking requirements not met.	Conduct outreach to fiscal lenders.	
Cul-de-sacs and Turnarounds				
Less impervious surface area by landscaping the centers of cul-de-sacs or reducing the diameter.	Adequate room for large vehicle turnaround.	Landscaped cul-de-sac must be designed to accommodate 36 foot inside turning radius, for fire access.	Fire trucks can back out on short streets.	
			Turf block can be used to accommodate emergency vehicles.	
Promote Alternative Transportation—Allow pedestrian alleyways to	Maintenance of landscaping.	Costs and management to maintain landscaping.	Home Owner Association or city can maintain.	

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connect dead end and cul-de-sac streets	Public safety concerns with connector alleys.	Liability concerns. Public safety concerns: Connector alleys can be dark, attract graffiti, un-maintained, and quick escape access for burglars, etc.	Keep alleys well lit, maintained.	
Permeable Pavements				
Provide surfaces for walking, driving, and parking while allowing infiltration of runoff.	Concern that they will not hold up under heavy loads and repeated travel. Liability concerns: Tripping or getting shoe heels caught in space between pavers. Disabled Access Issues—Apply to	Must be designed for a 70,000 lb gross weight load, if designed for emergency access. Financing and insurance costs significantly increase at perceived risk of increased liability, and lack of knowledge about marketability of product. Must be a stable, slip-resistant surface.	Design bed to withstand required loads; install in less traveled areas (e.g. parking stalls); install on flat slopes (less than 5%). Lenders may be more willing to take risks with well known, larger developers. Conduct outreach to fiscal lenders. Properly educate maintenance personnel. Consider ADA and Title 24 requirements for access (see	Disability Requirements: California's Title 24 requires the following clearance for sidewalks and pathways: • 48" minimum/ preferably 60" (ADA is 36" minimum) (Can be reduced to 36" if natural barriers in the right-of-way restriction); • >300 people occupancy load = 60" minimum; • 60" min when disabled must make a turn; • 60" if no passing

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	public streets and right of ways (not private) and any sidewalk or path that is the only avenue to a public building. Concern with soil compaction during site preparation, or clay soils, that surface will not be truly permeable.		notes at right). ADA and Title 24 do not specifically require having sidewalks on both sides of street. Amend or replace clay soils and protect infiltration areas from over-compaction. Pilot projects needed—examine effectiveness and maintenance requirements.	spaces of 60”x60,” spaces of interval not to exceed 200’ (Can be reduced by State Architect to 48” but not if the issue is occupancy load); • 80” clear space height requirement for tree limbs, signs, etc. over a path of travel; • ½” max requirement for grate holes.
SOURCE CONTROLS				
Cover Trash and Recycling Areas				
Prevents rain water from contacting pollutants and carrying pollutants to the storm drain.	Fire danger	Article II of Fire Codes: If the area is within 5 feet of a combustible structure, sprinklers are needed with a connection to the sanitary sewer. If area >5’ away from a combustible structure, then no sprinklers are needed.	Move area greater than 5 feet from combustible structures. Or Add sprinklers (concern: cost).	

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	Access Issues	Covers need to be non-combustible and accessible for trash disposal/pickup.	Design covers to be non-combustible and allow access.	
DRAINAGE TO LANDSCAPING				
Parking Lot and Street Drainage to Swales and Biofilters				
Reduce Directly-Connected Impervious Surface Area Provide Natural Treatment	Soil Contamination Concerns	Cost to remove soil. Liability Issues.	USGS City of Fresno study showed metals bind to top 1 " of soil. Soils need not be considered hazardous waste (USGS, 1995). Supported by other studies as well.	USGS "Potential for Chemical Transport Beneath a Storm-Runoff Recharge (Retention) Basin for An Industrial Catchment in Fresno, CA" by Roy A. Schroeder, 1995.
Reduce Volume and Velocity of Runoff	Not enough land area to dedicate to swale	Cost of land. Utility locations/ right-of-way requirements/ driveways can impact swale length and designs.	Discuss regulations early in the pre-application meeting; combine with landscaping requirements.	
	Maintenance	Maintenance costs.	Costs should not be more than regular landscaping; provide some background education.	Maintenance of surface controls is easier than fixing problems with an underground pipe.
	Plant Selection: Water Conservation	Plants need to be able to withstand inundation and meet water conservation requirements for	Use other, native plants.	Consider new field of phytoremediation as well—plants selected

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	Pesticide Minimization	drought tolerance. Best alternatives should also be pest-resistant.		specifically to take up certain pollutants.
	Solid Waste (for Turf grass)	Reduction of waste to landfill requirements result in discouragement of use of turf grass that needs frequent mowing (and watering, see above).		
	Effectiveness in Clay or Compacted Soils	Concern that soils compacted during site preparation, or clay soils, are not truly permeable. Localized flooding can contribute to accidents; and can harm road base.	Use bioretention systems (constructed systems using amended soils and underdrains may be located in a planter or concrete box.	Bioretention systems have been successfully used in the Northwest and Eastern U.S. Bay Bridge project will use these systems.
	Curb Cuts Blockage	Curb cuts placed too close to drain; short-circuits treatment.	Suggest curb cuts at least 1 foot in length to provide effective conveyance.	See SCVURPPP Infiltration Work Group products.
	Groundwater Contamination Concerns	Concern that infiltration of stormwater poses threat to groundwater quality.	Improve design Treating runoff via natural infiltration into soils is considered adequate protection of groundwater.	

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			See SCVURPPP Infiltration Work Group Recommendations.	
	Vector Control Issues	Mosquito breeding could increase rates of disease, such as West Nile Virus.	Design and maintain to drain within 72 hours.	
	Problems with Installation in Redevelopments	Streets/parking lots need to be graded to drain to swale.	Address in design/review stage.	Consider an impervious surface reduction program for existing businesses, similar to the City of Menlo Park's program.
		If area too narrow, swale slopes may be too steep causing increased maintenance and decreased effectiveness.	Address in design/review stage.	
		Plants or soil blocking entry of water to swale.	Ensure plants and soil material do not create a lip blocking drainage into the swale.	
	Design Issues	Scouring.	Cobbles can be installed to prevent scouring.	
		Tree root balls preventing adequate conveyance.	Plant trees on the swale slopes rather than in the middle; also helps prevent prolonged inundation of trees by	

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			stormwater. Use three stakes for trees to prevent blow-over as roots become established.	
		Infiltrated water could undermine roadbase.	Can be avoided with installation of barriers and; proper design.	
DISCONNECTING ROOF DOWNSPOUTS				
Slows velocity of runoff Pollutants are naturally treated in upper layers of the soil Reduces volume of runoff to storm drain system Water could be used for irrigation	Mushy lawns	Concerns that water draining from the roof will make lawns mushy, resulting in homeowners filling in low spots or extending drains to sidewalk.	Educate Homeowners. Have water drain to a cistern, pop-up emitter or dry well instead of allowing it to drain directly to lawn. Cisterns/dry wells can hold water and release it slowly and pop-up emitters can spread it further. Make sure dry wells meet SCVURPPP in-filtration guidelines/ SCVWD design requirements.	All soils except sands have volumetric response when wet, meaning that they can retain water.
	Vector (mosquito) concerns for Cisterns	Mosquitoes carry various diseases, such as the West Nile Virus.	Have sealed cover on cistern or drain completely within 48 hours. Conduct regular	

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			maintenance.	
	Undermining foundations	There is a concern that stormwater allowed to pool or drain towards building will undermine the building, foundation leading to further damage.	Building foundations should be protected with concrete as necessary. Extend down spout or pop-up emitter further out from building.	Sub-drains also help to prevent water from reaching foundations.
		Gutters concentrate flow.	Consider extending eaves and draining roof to landscaping.	
		Landscaping is generally installed quickly at the end of a project so slope requirements may not be met.	Slope landscaping away from foundations at a minimum of 2%. Have building inspectors check off on this as a requirement.	
	Litigation	Water damage to homes (e.g. mold) due to moisture transmission through foundation of homes.		
REDUCING THE BUILDING FOOTPRINT				
Encourage more mixed-use buildings— Buildings of equal floor	Visual aesthetics	Mixed-use will bring in more traffic and reduce the amount of parking that is available.	Private parking spots will ensure sufficient parking for residents. Encourage the use of public transportation.	Consider regional solutions, including input from Central Valley. Sprawl development leads

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area ratio can have widely different impervious coverage, depending on the site coverage and floor area ratio Reducing the building footprint reduces the overall impervious surface area.	Town/City Character; Not in my back yard (NIMBY) Attitudes	General aesthetics.	Provide open spaces for recreation. Not only do open spaces provide pervious surfaces, but they will encourage more people to move in mixed-use areas because they are providing an area for recreation.	to longer commutes and associated transportation impacts to the watershed.
	Privacy Issues	People do not want tall buildings in their neighborhoods because people in taller buildings can look into the backyards of other residents.	Design to protect privacy. Educate, market to modify preference ideals.	
	Personal Preferences	Developer perception that most people want private homes, own land.	Market higher density, mixed use to older demographic desiring to be close to various social activities and not required to care for larger pieces of property. Work to provide financial incentives to this demographic (e.g., reduction capital gains tax)	
	Lack of Available Insurance	Only two insurance companies in California are willing to insure	Solve potential problems to improve marketability: During	Closer examination of this issue needed.

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		connected or mixed use projects due to liability issues with these projects.	design carefully consider parking availability, increase in traffic, hazardous materials, and environmental impediments when considering mixed use projects.	
	Costs	Costs to developers in terms of delays in obtaining approval, and higher lending rates for any innovative site designs that lenders fear is risky from a marketability standpoint. For four-story buildings or lower, construction industry can use wood. Any higher and steel frames are necessary, but not cost effective unless buildings are seven-stories or higher.		
GREEN ROOFS				
Green roofs will reduce the amount of impervious area and provide some treatment	Initial cost of green roof; maintenance costs	Fear that green roofs will cost a lot of money.	Green roofs currently cost about $8-$11/sq. ft. but in Europe the cost is much closer to about $2/sq. ft. because of mass	Costs are on par with tile and slate roofs. Green roofs provide

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and detention of runoff.			production of materials. As more roofs installed, costs will decrease. Costs can be recouped by energy savings. Ensure proper design and installation to reduce costs over time.	insulation; which can save money in the long run. Green roofs also reduce the amount of noise pollution that enters the building, increasing productivity.
		Lifespan.	Properly designed, installed, and maintained, green roofs can last over 50 years.	
		Air Conditioning Units.	Need not always be moved; condensate can be used to help irrigate the roof. Intakes near plants will take in cooler air to begin with to help reduce costs.	
		Use in Retrofits.	Consider load requirements. Would need to remove and replace existing roof seal.	
	Fire Concerns	If vegetation is not properly maintained, there is a fear that it will	An irrigation system can be installed to reduce the risk of	Stanford Medical Center's green roof will hold

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		become a fire hazard, especially in Mediterranean climates.	fires. Also, planting succulents and sedums and providing adequate maintenance will reduce the risk of fires.	18,000 gallons of water in a 1-hour storm event resulting in a weight load of 80 lbs per square foot, equivalent to that of tile or slate roofs.
	Earthquakes	Load, structural requirements.	Properly design and anchor trees.	Recommend use of GIS to map utility and other lines.
	Maintenance	Amount needed.	Maintained like any other landscape. Can be designed to be low maintenance. For roofs with native grasses such as the Gap Building, only maintenance is mowing of the grasses once or twice a year (with weedeaters) and providing irrigation if needed.	
		Concern re: soil erosion from roof.	Choose correct soil and plant types to avoid erosion, depending on local climate, depth of soil, allowable weight, roof slope, etc. and mechanical and nutrient requirements.	

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		Public Safety.	Tie downs for maintenance workers, and low exterior walls can be incorporated into building design. Can limit public access if necessary.	
	Root Penetration of Roofing Layers	Concern that the roof will leak or a plant will penetrate into the roof.	There is a membrane that is placed on the roof that prevents plant roots from entering the building; this also prevents leaks. Manufacturers provide a 40-year warranty on the membrane. Use plants with shallow roots. Properly anchor trees.	
	Untested Technology	Lack of knowledge about use and location of greenroofs.	Green roofs also provide an area for recreational usage Local Examples include: Big Sur, CA (Post Ranch Inn); Healdsburg, CA (a casino using salt ponds on the roof, a sustainable design that does not require an abundance of	Green roofs have incorporated organic gardens and soccer fields (Maui). Other examples: Massachusetts (on the MIT campus, where the water is carried down a

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			irrigation, fertilizers or pesticides); San Bruno (the Gap Building); Palo Alto (SGI Building (now Google)), Stanford (Stanford Medical Center parking lot); Santa Cruz mountains (Presentation Center); Oakland (Kaiser Building; and Oakland Museum); and San Francisco (California Academy of Sciences, under development).	green wall to a vegetated swale); Seattle, WA (Justice Department Building); Portland, OR (Civic Center); Salt Lake City, Utah (Latter Day Saints Conference Center); Vancouver, BC (public library); Tehama (Clint Eastwood golf course, containing underground parking beneath the course) and Venice Beach (high density live-work development).
REDUCING THE PARKING FOOTPRINT				
Encourage Fewer Parking Spaces Via Parking Maximums or Incentives				
Encourage use of alternative transportation to reduce transportation related pollutants Reduce impervious	Non-competitiveness	Fear that maximum parking requirements makes city less competitive and not as business friendly compared to surrounding communities that do not have such requirements, resulting in lost tax revenue for cities.	San Jose found parking ratio incentives are more effective than maximum requirements. Promote mass transit, carpool, vanpool.	.

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surface area	Fewer parking spaces available on busy days	Developers and lenders fear loss of business. Lending agencies not willing to finance because they perceive risk is too high .	Uniform adoption at regional/state/ nationwide level. Permeable paving in overflow areas for peak day use. Lenders may be more willing to take risks with well known, larger developers. Provide landscape reserves in parking lots that can be eventually developed if the site development increases or more parking is needed. Conduct outreach to fiscal lenders.	
Structured, Multi-story Parking				
Reduce impervious surface area	Costs	Surface parking lots are less expensive than structured lots (not taking into account cost for land). Costs to developers in terms of delays in obtaining approval, higher lending rate.	Provide credit for parking structures for transit-oriented developers (e.g., savings on floor area).	

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		For four-story buildings or lower, construction industry can use wood. Any higher and steel frames are necessary, but not cost effective unless buildings are seven-stories or higher.		
	Public Safety		Incorporate safety features (higher ceilings, bar railings, lighting, shrubbery height, etc.)	
Shared Parking -Businesses With Offset Hours				
Reduced impervious surface area	Obtaining fiscal lending approval-concern that uses will change over life of project resulting in not enough parking	Fears that agreement will end. Less parking available if hours overlap or there is a busy day resulting in fears of less profitability.	City owned-multiple-use lot.	Reduce width of parking spots/require compact parking spaces. Use tuck-under parking.
Permeable Pavements.				
See section under "Streets."				
STRUCTURAL SOILS				
Structural soils allow for tree to grow to maximum ability in	Initial cost of using structural soils; maintenance costs	Structural soils are thought to be expensive to use in projects since they cost more that regular soils.	Structural soils provide the roots room by allowing the roots to grow downwards. Regular soils	Structural soils are a mix of topsoil and jagged rocks. The rocks mesh

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tight areas without damaging sidewalks, etc. Soils can help naturally treat and reduce amount of stormwater runoff. Increased tree canopy absorbs more rainwater.		Structural soils cost $40 per cubic yard compared to regular soils that cost $29 per cubic yard. Along with structural soils, a one-time slow release of fertilizer is introduced. This is the only associated cost with structural soils.	do not allow as much room for growth for a tree so tree roots grow upwards, causing cracks in sidewalks and streets. Trees growing in structural soils don't encounter this problem so structural soils cost bring savings over the life of the project (20-40 year lifespan).	together to form a latticework; as the spaces in the lattice fill with soil, the resulting mix can be compacted enough to support pavement while still allowing roots and water to penetrate easily.